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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,062	12/09/2003	Bruno De Man	133643-1/YOD GERD:0071	3735
7590	06/17/2005		EXAMINER	
Patrick S. Yoder FLETCHER YODER P.O. Box 692289 Houston, TX 77269-2289			SONG, HOON K	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 10/731,062	Applicant(s) MAN, BRUNO DE	
	Examiner Hoon Song	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: "the weight measure is derived from the measured sinogram data" is not described in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-8, 10-13 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original specification does not describes "the weight measure is derived from the measured sinogram" rather describes the weight measure is derived based on the measured sinogram", and one skilled in the art would not understand how to generate the corrected sinogram data and the weight measure both from the measured sinogram data in order to generate improved sinogram data. For examination purpose the examiner considers the phrase as "the weight measure is derived based on the measured sinogram data"

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (US 6426988B2).

Regarding claims 1, 14 and 24-27, Yamada teaches a method, a processor or computer readable medium for reducing artifacts in image data generated by a computed tomography system, the artifacts being due to the presence of a high-density object (M) in a subject of interest, comprising:

receiving measured sinogram data ($f(P)$) from the computed tomography system, the sinogram data representative of a plurality of sinogram elements (column 8 line 13-30, column 12 line 41-47);

reconstructing the measured sinogram data to generate initial reconstructed image data (column 12 line 48-58);

generating corrected sinogram data using the measured sinogram data (column 9 line 25-30);

assigning a weight measure to each sinogram element in the corrected sinogram data, wherein the weight measure is derived based on the measured sinogram data (the measured projection data $f(P)$ and the estimated projection data $F(b_k)$ are compared with each other to derive comparison reference image and the comparison reference image d_k is weighed according to a length where x-rays pass through the high absorber

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area to thereby derive a weighted comparison reference image e_k , column 8 line 59-64 and pixel values of the measured projection data $F(b_{k+1})$ in the portion L where x-rays pass through the high absorber area is replaced by the pixel values according to the overwritten estimated projection data $F(b_{k+1})$ to correct the measured projection data $f(P)$ and derive or obtain a corrected projection data $F(P_2)$ (column 9 line 19-30)); and

iteratively reconstructing the corrected sinogram data to generate improved reconstructed image data based on the weight measure associated with each sinogram element (column 18 line 1+).

Regarding claims 2 and 15, Yamada teaches generating corrected sinogram data using the measured sinogram data comprises using a projection completion technique (column 17 line 13-30).

Regarding claims 3 and 16, Yamada teaches generating corrected sinogram data further comprises identifying a trace of the high density object in the measured sinogram data; and correcting the measured sinogram data in the trace of the high density object (column 13 line 1-18).

Regarding claims 4 and 17, Yamada teaches identifying a trace of the high density object comprises:

segmenting the high density object (M) from the initial reconstructed image data (figure 1, column 13 line 1-3);

reprojecting the segmented high density object from the initial reconstructed image data to generate reprojected sinogram data (F image in figure 1); and

identifying a trace (L) of the high-density object based on the reprojected sinogram data (column 13 line 21-28).

Regarding claims 5 and 18, Yamada teaches identifying the trace of the high-density object comprises comparing each sinogram element in the measured sinogram data to a pre-defined threshold value (column 13 line 32-37).

Regarding claims 6 and 19, Yamada teaches identifying the trace of the high-density object comprises assigning a reliability measure to each sinogram element in the measured sinogram data (column 13 line 1-3).

Regarding claims 7 and 20, Yamada teaches correcting the measured sinogram data is performed using an interpolation technique (column 16 line 24).

Regarding claims 8 and 21, Yamada teaches correcting the measured sinogram data is performed using techniques selected from the group consisting of consistent completion techniques, spline based completion techniques, iterative correction techniques and non iterative correction techniques (column 14 line 28).

Regarding claim 10, Yamada teaches the weight measure is derived based on a relative position of each sinogram element with respect to the trace of the high-density object (column 15 line 17).

Regarding claim 11, Yamada teaches the weight measure is derived based on simulated sinogram data (column 12 line 59).

Regarding claims 12 and 22, Yamada teaches the initial reconstructed image data is generated using a filtered back projection technique (column 10 line 59).

Regarding claims 13 and 23, Yamada teaches iteratively reconstructing the corrected sinogram data to generate improved reconstructed image data is performed using techniques selected from the group consisting of maximum likelihood (ML) techniques and maximum a posteriori (MAP) techniques (column 2 line 40).

Response to Arguments

Applicant's arguments filed 3/24/2005 have been fully considered but they are not persuasive.

The applicant argues that Yamada reference fails to teach the weight measure is derived from the measured sinogram data. But the examiner disagrees.

Yamada teaches the measured projection data $f(P)$ and the estimated projection data $F(b_k)$ are compared with each other to derive a comparison reference image d_k based on the back projection of a difference or ratio between both data (column 8 line 57-67) and a weighted ART/EM method includes processes from derivation of the initial projection data $F(b_0)$ to the overwriting to the estimated image b_{k+1} , and the overwritten estimated image b_{k+1} is forward projected to obtain an overwritten estimated projection data $F(b_{k+1})$ (column 9 line 19-30) and the pixel values of the measured projection data $F(b_{k+1})$ in the portion L where x-rays pass through the high absorber area is replaced by the pixel values according to the overwritten estimated projection data $F(b_{k+1})$ to correct the measured projection data $f(P)$ and derive or obtain a corrected projection data $F(P_2)$. Thus the weight measure is derived based on the measured sinogram data (column 9 line 19-30) and Yamada clearly teaches the corrected sinogram data is iteratively reconstructed to generated improved reconstruction image data based on a weight

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measured associated with each sinogram element where the weight measured is derived based on the measured sinogram (column 18 line 1+). In view of the foregoing discussion, the examiner respectfully submits that Yamada teaches each and every element as set forth in independent claims and accordingly, Yamada anticipates the claims.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is (571) 272-2494. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272 - 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HKS

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HKS



DAVID V. BRUCE
PRIMARY EXAMINER